The Journal of Academic Social Science Studies

JASSS

International Journal of Social Science
Doi number:http://dx.doi.org/10.9761/JASSS2552
Number: 29 , p. 313-338, Autumn III 2014

HEALTH-SAFETY RISKS AND PRECAUTIONS AT LIBRARY AND ARCHIVE BUILDINGS

KÜTÜPHANE VE ARŞİV BİNALARINDA SAĞLIK - GÜVENLİK RİSKLERİ VE ÖNLEMLER

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Abstract

Library and archive buildings are crucial both because they are public facilities used by protect many collections regarded as cultural heritage. As in all business locations, library and archive buildings have threats related to occupational health and safety and risks resulted from these. The most important difference diversifying library and archive buildings from other business locations is that the risks at these buildings not only pose a challenge for the staff, visitor, researcher and students using these, but also for library and archive material in form of cultural heritage holding light on the past such as rare collections, documents, maps and photos. Yet the loss of both human and cultural heritage collections cannot be restored.

While these are structural risks that can give rise to accidents or be resulted with injury, impairment of health or death in case of emergency/disaster situations for the people using these buildings; all of the collections and archive materials in the feature of cultural heritage are affected by both these structural risks and environmental conditions such as temperature, humidity, light and dust. Because of these proactive precautions against the threats at whole of the building (reading hall, storage areas) or around it shall be made. In order to take these measures, it is important to have risk analyses in which potential threats in library and archive buildings are determined, monitoring based on calculation and observation, frequent revision activities and regulative and preventive control precautions.

In this study, health and safety risks in library and archive buildings within the scope of Code on Occupational Health and Safety with the number of 6331 are evaluated and precautions in order to reduce current risks in acceptable levels are determined. With this aim, "**5x5 Risk Assessment Table**" method is used. In order to provide that the application shall be operable for all of the library and archive buildings and serve as a model, potential risks not at

definite library or archive buildings but at any library and archive buildings are evaluated.

In risk assessment study, risks that shall give harm to both staff and collections are analyzed. 40 risk factors are determined diversely for the staff and the collections, being 10 "**Environmental Risk**" and 10 "**Disaster Risk**". Undoubtedly, it is possible to mention about hundreds of risk factors at library or archive buildings. However, in this study it is focused on threats that are mostly met.

Key Words: Protection of Cultural Heritage, Occupational Health and Safety, Emergency Planning, Information and Document Management

Özet

Kütüphane ve arşiv binaları, hem çok sayıda insan tarafından kullanılan kamu tesisleri olmaları hem de kültürel miras sayılan pek çok eserleri muhafaza etmeleri açısından önemlidir. Tüm işyerlerinde olduğu gibi kütüphane ve arşiv binaları da iş sağlığı ve güvenliği açısından tehlikeleri ve bu tehlikelerden kaynaklanan riskleri bünyesinde barındırır. Kütüphane ve arşiv binalarını diğer işyerlerinden ayıran en önemli fark, risklerin sadece bu binaları kullanan personel, ziyaretçi, araştırmacı ve öğrenciler için bir tehdit oluşturmakla kalmayıp; aynı zamanda geçmişe ışık tutan nadir eser, belge, doküman, harita ve fotoğraf gibi kültürel miras niteliğindeki kütüphane ve arşiv malzemesi için de tehdit oluşturmasıdır. Zira hem insan hem de kültürel miras eserlerinin kaybı geri getirilemez özelliktedir.

Bu binaları kullanan insanlar için, kazaya durumunda, afet / acil durumda yaralanma, sağlığın bozulması veya ölüm ile sonuçlanabilecek yapısal riskler mevcut iken; tüm insanlığın kültürel mirası niteliğindeki eserler ve arşiv malzemeleri, hem bu yapısal riskler hem de sıcaklık, nem, ışık, toz gibi çevresel koşullardan kaynaklanacak risklerden etkilenmektedirler. Bu nedenle bina bütününde (okuma, depolama alanları) olan veya bina çevresinden gelebilecek olan tehlikelere karşı proaktif önlemlerin alınması gereklidir. Bu önlemlerin alınabilmesi için kütüphane ve arşiv mekânlarındaki potansiyel tehlikelerin belirlendiği risk analizleri, ölçüm ve gözleme dayalı izleme, sürekli gözden geçirme faaliyetleri ile düzenleyici ve önleyici kontrol tedbirlerinin tanımlanması önem kazanmaktadır.

Bu çalışmada 6331 Sayılı İş Sağlığı ve Güvenliği Kanunundaki mevzuat kapsamında; kütüphane ve arşiv binalarındaki sağlık ve güvenlik riskleri değerlendirilmiş, mevcut risklerin kabul edilebilir düzeye indirilebilmesi için alınması gereken önlemler belirlenmiştir. Bu amaç için "5x5 Risk Değerlendirme Tablosu" yöntemi kullanılmıştır. Uygulamanın tüm kütüphane ve arşiv binaları için kullanılabilir olması ve bir örnek teşkil edebilmesi için belirli bir kütüphane veya arşiv binası yerine herhangi bir kütüphane veya arşiv binasında karşılaşılabilecek riskler değerlendirilmiştir.

Risk değerlendirmesi çalışmasında hem çalışanlara hem de eserlere zarar verebilecek riskler değerlendirilmiştir. Çalışanlar ve eserler için ayrı ayrı, 10'ar adet "Çevresel Risk" ve 10'ar adet "Afet Riski" olmak üzere toplam 40 risk faktörü belirlenmiştir. Şüphesiz ki kütüphane veya arşiv binalarında yüzlerce

risk faktöründen bahsetmek mümkündür. Ancak çalışmada en çok karşılaşılan tehlikeler üzerinde odaklanılmıştır.

Anahtar Kelimeler: Kültürel Mirasın Korunması, İş Sağlığı ve Güvenliği, Acil Durum Planlaması, Bilgi ve Belge Yönetimi

1.Introduction

The library and archive buildings include rare collections holding light on the past and library and archive materials that require to be protected. The archive buildings are not only the locations serve to protect cultural heritage but also the locations where current data and docuements of the institutions are stored. These kind of archive materiakls belong to public institutions, hospitals and universities. As in all business locations, it is also possible for the staff in library and archive buildings to be damaged in short, medium and long term by the threats in case that no precaution is made. As a result of these risks against the staff, occupational disease, injury and death; and due to risks against the collections and archive materials severe damage or extinction of the materials can occur[1].

Especially, disasters such as fire and flood have impact on much precious archive materials made by paper. These diasasterrs can happen naturally or by human because no precaution is made. There are many examples for the damage of library and archive materials caused by the disasters. Among these disasters, many library buildings and the collections within them are destoyed by the earthquakes and tsunami followed by it. Extremely severe damages occur due to tornados. These kind of disasters with destructive effect cause severe damages in both underdeveloped and developed countries[2]. Because of this each person responsible for protection of libraries and archives shall have precautions against disasters and emergency situations, then potential losses will be minimized.

Because library and archive buildings are open for the use of many people, if appropriate measures are not taken, in case of a potential disaster or emergency

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[1] Improper indoor conditions have impact on organic and inorganic works. In wetting and drying cycles some physical, chemical and biological distortions occur on works such as change of size, cracking, breaking, thinning and breaking of the fibers, yellowing, swelling, shrinkage, embrittlement and fracture (Johnson and Horgan,1979, p. 31-32). In order to avoid distortion of these works, international standards determined for museums, libraries and archive buildings shall be supplied at indoor conditions (Principles for the Care and Handling of Library Material (Adcock,1998)- International Preventive Conservation Stardarts (Alcantara, 2002, p.34-38).

[2] In 1988 Gilbert Tornado caused damage of 50% - 70% of the collections and extinction of 150.000 books and journals, of Jamaica Kingston, West Indies University Norman Manley Law School due to the water injected inside (Aarons, 2003, p.11-14). In 2005, due to a tornado in Sweden Falkenberg, sea water injected from a window that was broken because of a blast and some hundred thousands of archive boxes were damaged. Again due to Hurrican Tornado happening in USA in 2005, 23 of the 188 libraries within 140 miles were destructed, 33 were severely damaged and 37 had intermediate level of damage in one hour in Lousiana (Clareson and Long, 2006, p.38-41).

situation, life and material loss can occur. Additionally, as long working periods of libariries are considered, enviromenmtal risk factors will be more effective. At these places where the staff and users exist together, due to conditions based on the location and environmental factors, occupational accidents and some health problems can occur.[3] With this aim, handling occupational safety and security as a type of management; measuring and rehabilitating performance are the ways to be followed by all of the establishments (Özdemir and Topcuoglu, 2009, p.31-33).



Figure 1. Example of library with dusty ground, not stablized and hard for disposal (on the left), Example of a library with no carpet, with stablized and proper spacious shelves, and the safety precautions are rised- Yeni Yüzyıl University Library Building (on the right)

A successful occupational health and safety (OHS) covers risk assessments in which all of the current risks in business locaitions are determined and risks are defined, these risks are prioritized, frequent monitoring of the proioritized risks are performed (calculation and observational assessment); accordingly exposeure rate of the risks are determined and preventive activities are defined. With the help of

[3] The people mostly spend their activities at business at business locations. "Sick Building Syndrome" (SBS) resulting from the building itself threatens the staff. Especially environmental factors such as the worse indoor air quality have impact on the staff. In a research on SBS made in Umman Sultan Quaboos University (SQU), a comparison between old and new library buildings is made and also a questionnaire on the staff working at these libraries is performed. Regarding the questionnaire; it is found that air in new buildings is more efficient than in the old ones (new building: 71.1%, old building: 47.8%), the air in new buildings is drier (New building: 45.2%, old building: 34.9%), humidity is lower in new buildings new building: 22.2%, old building: 36.4%), dust is lower in new buildings (new building: 12.8%, old building: 22.2%), new buildings are colder (new building: 53.3%, old building: 26.7%). Regarding the questionnaire on symptoms mostly seen in the staff; for the **staff of old buildings** it is found that sinusitis 35.4%, eye inflammation 33.3%, headache 33.3%, rapid feelings of exhaustion and fatigue 31.3%, throat dryness 27.1%, weariness and laziness 25% and general weakness and dizziness 25%. For **the staff of the old buildings**, it is found that nasal congestion 35.4%, throat dryness 31.3%, sinusitis 22.9%, eye inflammation 20.8%, mood swings 22.9%, laryngitis 18.8%, headache 18.8% (Abdul-Wahab,2011, p.211-233).

frequent rehabilitations, by consulting in-house and out-house experts in each stage, the ideal OHS management shall be provided (Figure 2).

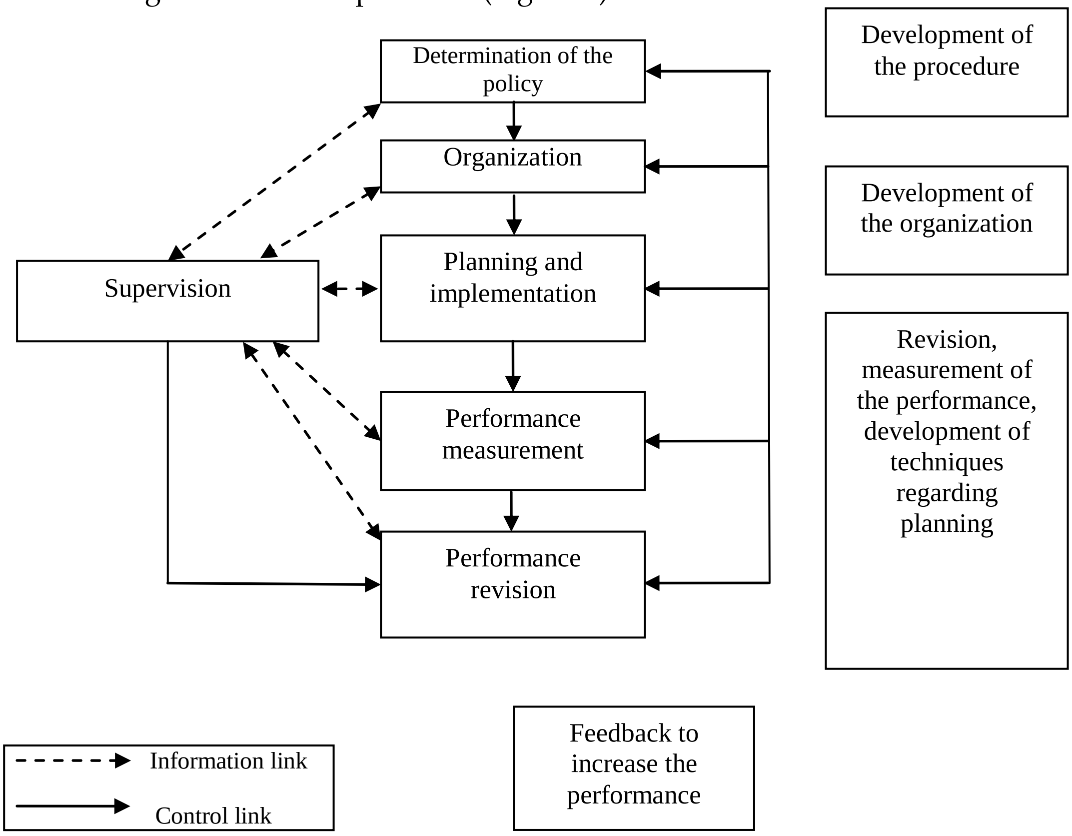


Figure 2. Scheme on Occupational Health and Safety Management (HSE-HSG65, 2001,p.7)[4]

In accordance with Occupational Health and Safety policies determined by Brighton University, UK; there are rules that shall be obeyed by the staff, academicians, students and other people at the univeristy campus. Regarding these rules; chemical safety, working with ionized radiation, regulations of contractors and student settlements for fire safety and emergency procedures, first aid and accident reporting, safety supervisions, risk assessments, secure use of work equipments such as manual use, electrical devices, computers, personal safety equipments, business environment safety, site safety, working alone and working outside, access to dangerous zones, disposal of hazardous wastes are prepared. All of these provide minimization of

[4] In UK HSE's publication HSG65 (Successful health and safety management) http://www.hse.gov.uk/opsunit/perfmeas.pdf

threats at university campuses and that people live/work at a secure environment[5] (http://staffcentral.brighton.ac.uk, 2012).

2. Proactive Monitoring

As the threats in library and archive buildings(information-document centerrs) are determined, just like in all of the business locations; in grouping performances; legislation based (by taking Legislation on Occupational Health and Safety as the basis), process based (by taking the systems such as ISO 9000 Quality, ISO 14001 Environment, OHSAS 18001 ISG as the basis) , settlement based (by taking facility plans and departments as the basis) and scientific based (by taking physical, chemical and biological features as the basis) are used. (Öztürk, 2011, p.72-75). In the risk assessment of this study, **scientific based grouping** is considered.

The precautions that are required to be made before the threats determined at library and archeve buildings transform into risk are defined as proactive approach. The precautions taken to avoid, for the staff at that buildings, occuoational diseases, any event that will result with injury or death; will provide minimization of the damage. These proactive precautions cover actinos that do not reuqire intervention (monitoring, precautions against unstructural risks, designing in accordance with proper climatic conditions apt to the object, periodic controls, training of the staff, etc.).

Among these actions:

- Monitoring and recording degree of influence of environment factors (light, relative humidity, temperature, air pollution, etc.),
- Analysis/supervision and recording of the status of the objects,
- Controling of environmental factors,
- Application of Comprehensive Biological Protection Management (CBPM) in all of the locations where collections are present,
- Making regular applications regarding transportation, storage, exhibition, cleaning, maintenance, packaging, conveyance techniques; are crucial.

Passive conservation stages for museum, library and archive buildings are as follows;

- **Climate conditions:** To bring risk factors such as temperature, humidity, light, etc. to the most proper standards for the objects. For organic objects, adaptation to the conditions shall be obtained before included into the environment, for inorganic objects, low relative humidity conditions shall be provided for avoiding a potential corrosion.
- **Pollution:** Precautions shall be made against gas and particle originated pollution. Exhibition shelves and storage boxex may release abrasive gases, dusts on the objects may become active higroscopically and chemically, so absorb the moisture; that causes corrosion of the object and different form of damages.

[5] Key factors for a successful occupational health and safety system at Brighton University, UK. http://staffcentral.brighton.ac.uk/safety/policy.shtm

- **Proper storage and maintenance:** Default exhibition, default storage and conveyance, damage of the objects due to accidents shall be avoided (Edson, 1997, p.191-192).
- **Safety:** Safety planning of the objects for peace and especially war periods (for the risks such as terror, theft, pillage, etc.) is crucial.
- **Disaster planning:** Disaster risk planning against potential diasasters will provide minimization of risks against natural and human-made disasters (Myrbakk, 2005, p. 1-7).

Proactive monitoring for indoor conditions shall be made as 7/24. Besides indoor threats, frequent monitoring of threats against nonstructural materials that is one of the most important factors causing damage for both human and collections and continuing periodic controls for this is a necessity.

In a building, nonstructural materials can be defined as; ceiling materials, windows, office equipments, cupboards, shelves, air conditioning systems and equipments such as heating, ventilation, electricity equipments, furniture, lambs, fire extinguishing systems, water tanks, generators, wall-mounted electronic apparatus, showcases, signboards, panels, computer equipments, etc. (Fierro, Freeman, Perry, 1995, p.4). While a part of these materials are mounted to the building right after the construction of the building; materials such as computer and furniture are brought to the building later by the users.

As the structure of the library is considered in terms of nonstructural components, reading halls (if available conference hall), administrative offices and storage areas come to the forefront. In the first instance life safety and in the second instance object safety shall be taken into account. Improperly stabilized ceiling materials, cabling systems for fire, ventilation and lightening, etc. not only threaten human life, but also cause irrevocable damages of the objects. Some of the risks are flopping of the cupboards together with the books, breaking of the glasses, collapsing of the ceiling systems, dropping of the collections such as pictures exhibited on the walls, inadequate fire systems, not using fire-resistant materials, dropping precast concrete panels, damaged walls or railings (at ladder and entry-exit doors), dropping of the materials mounted at the surfaces of the walls. In a pilot project performed in schools of California, USA; the risks arising from nonstructural materials in schools are preferentially grouped in three categories such as high bookcase and file cupboards, hanged lightening and heavy ceiling systems and hazardous materials[6] (FEMA, 2011, p.4-20).

[6] States materials and officinal having one or more of the explosive, oxidizing, very easily flammable, easily flammable, flammable, extremely toxic, toxic, detrimental, abrasive, irritating, allergic, carcinogenic, mutagen, toxic and hazardous characteristics against the environment (Regulation on Hazardous Chemicals).

Other than default assembly and nonstructural risks arising from not making periodic maintenance that are man-made risk factors; staff-made risks such as default storage,exhibition, conveyance risks[7], visitor risks, theft, vandalism risks, not taking precaution against infrastructure and fire risks are also based on human factor.

3. Risk Assessment

In risk assessment recommended within the scope of the study, only risks arising from threats such as **"Emergency/Disaster"** and **"Environmental Conditions"** that are among many risks existing in libraries are considered. Additionally, protective and preventive precautions against these risks are introduced. As assessing risk factors having impact on the staff and collections separately, the most risky status is determined.

Undoubtedly, there are many threats affecting these kinds of locations. Just for the flapping risk from the threats and risks determined in the Risk Assessment stated in ANNEX 1 there are many threats. The risks mentioned below are potential for just flapping risk:

- Crushing or breaking of the collections due to destruction of the building by the earthquake,
- Crushing of the collections due to flapping of the storage units or objects/furniture that are nonstructural because of the earthquake
- Damage of the collections due to dropping of the collections from the shelves because of the earthquake,
- Damage of the collections due to collapsing of the partial roof because of the snow load,
- Damage of the collections due to explosion (war, chemical offense, sabotage, rebellion, etc.),
- Damages of buildings and collections due to severe storms such as tornados
- Due by dropping down the damage of the collections from the shelves due to crushing of the transportation container
- Damage of the collections by the staff within the scope of maintenance, repair and safety performances in the building (intentionally/unintentionally)
- Physical damages by the users during the use the collections (dropping while copying, etc.)
- Physical damage of the collections by dropping due to default handling of the staff (manual handling, dropping by crushing to door stones, giving rise to dropping of the books by putting many of them over and over, etc.)

[7] In a research performed in Australia Dandenong City Libraries, it is found that among the injuries of the staff. It is mostly due to manual handling, many regulations are made in order to avoid the issue of manual handling in the libraries. The staff is trained in terms of manual handling techniques, trainings regarding the impacts of default manual handling of the books on the spinal mechanics in time are given (Brown, 2008, p.8).

- Damages caused by the staff by dropping during dusting/cleaning activities
- Damages due to shelves of the collections (drawer, cupboard jam) (Waller, 2003, 78-79).

4. Method

In risk assessment, risks having potential impact on both human and collections are analyzed. These risks giving rise to occupational disease, injury or death, extinction or damage of archive materials are determined separately for human and collections; the total of 40 risk factors, being 10 as "**Environmental Risk**" and 10 "**Disaster Risk**" for human and collections. Undoubtedly, it is possible to mention about many risks at library or archive buildings. However, in this study it is focused on the mostly found threats. As a risk assessment method, "**Risk Assessment Tables**" method is used.

4.1.Legal Basis of Risk Assessment

Code on Occupational Health and Safety with the number of 6331 Article 4-(1):

The employer is obliged to provide health and safety of the staff regarding the work and within this framework;

a) Makes preventing occupational risks, taking any kind of measure including training and giving information, making organization, providing required tools and equipments, optimizing health and safety measures to changing conditions and rehabilitating the current situation.

b) Monitors and supervises whether occupational health and safety measures are obeyed or not, enables removal of the nonconformities.

c) Makes or orders the performing of risk assessment.

d) While assigning a staff, convenience of the staff for that mission in terms of health and safety is considered.

e) Necessary precautions are made in order to avoid the staff other than the ones adequate information and instruction are given, accessing to locations with life-critical and private threats[8].

Regulation on Occupational Health and Safety Article 9:

a) Employer;

- Makes risk assessment regarding health and safety covering the status of labor groups that may be distinctively affected by the risks in business locations.
- According to the result of the risk assessment, the preventive precautions and protective equipments are chosen (Esin, 2004).

4.2.Aims of the Risk Analysis

The aims of the risk analysis are as follows;

- Finding risk focuses,

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[8] Code on Occupational Health and Safety with the number of 6331 and the year of 2012.

- Assess them,
- Determine the precautions,

- determine the rank of the precautions,
- determine the savings,
- determine the expenses,
- determine the most economic method for the enterprise without sacrificing safety,

- Providing realization of the precautions,

- determine whether the aims are achieved or not,
- not causing another risk while preventing a risk (http://isag.calışma.gov.tr)

4.3.Determination of the Risks and Assessment Process

Starting from the view that Occupational Safety requires experience, in determination of the units included in this process, the units determined in the article of Formation of the Rules Occupational Safety that is the 5th article of the Code on Occupational Safety and staff giving service for years at that business location are selected. By assigning the staff at the shifts, the determination of the potential risks at the shifts is aimed.

The performances are done in 5 stages[9];

4.3.1: Definition of the threats

* By obeying the work flow at the business location, visiting each point, and considering the experiences, what may give damage to the staff, collections and business equipments are evaluated.

* First of all, by determining all of the threats and sources of the threats without distinguishing as big-small, important-unimportant, a threat list is formed.

* Because risk assessment is a group work, the views of each of the staff responsible for that work are learnt.

* Information regarding all of the recorded or un-recorded occupational accidents of the unit, in the past, the risk assessment of which is performed.

* The instructions of the machine producers and material safety information forms are reviewed for the determination of the threats.

4.3.2: Assessment of the Risks

In the assessment of the risk, Risk Assessment Table (RAT) method is used. RAT, is a technique, in the assessment of the risks, used in which collections shall be given priority and where the sources shall be transferred in accordance with the results of the assessment. The preparation of this table is based on the approach of applying the experiences from the events in the past for the estimation of the risks of the system.

• Vertical axis; defines levels of Probability (1-5).

• Horizontal axis; defines the Severity (1-5).

• The boxes in the table; define Risk Levels decreasing from the left top edge of the table to the right bottom.

[9] Ministry of Labor and Social Safety, "Risk Assessment in 5 Steps", Vol. No:140, May 2007

• In order to define the risk level, table is divided into Red, Blue and Green areas.

As the risks are assessed, the severity and probability of the event caused by the threat is taken into account. 5x5 Risk Assessment Table is used for the risks that are determined. Here the risk is calculated by the formula,

Risk = Probability x Severity

For the values of probability and severity, the values given in the table below is used.

Table 1. Probability values used in risk calculation.

Frequency	**Probability**	**Probability Value**
Once a year	VERY LOW	1
Once in three months	LOW	2
Once a month	MEDIUM	3
Once a week	HIGH	4
everyday	VERY HIGH	5

Table 2. Severity values used in risk calculation of the staff and users (SU).

Event	**Severity**	**Severity Value**
No loss of work hour, requires first aid	VERY LOW	1
No loss of work day, requires first aid	LOW	2
Slightly injured, requires treatment	MEDIUM	3
Death, Severely injured, occupational disease	HIGH	4
More than one death, permanent incapacity to work	VERY HIGH	5

Table 3. Severity values used in risk calculation for organic based library and archive materials (LAM).

Event	Severity	Severity Value
Impacts with no damage like sliding of the material (The intervention of the staff on the materials)	VERY SLIGHT	1
Slight damage of the material (Intervention on the material by passive conservative method)	SLIGHT	2
Medium damage of the material (Intervention on the material by active conservative method)	MEDIUM	3
Severe damage/extinction of the material (cutting of the library-archive services)	SEVERE	4
Severe damage/extinction of more than one material (cutting of the library-archive services)	VERY SEVERE	5

Table 4. 5x5 Risk Assessment Table.

	RISK LEVEL				
	Severity				
Probability	VERY SEVERE 5	SEVERE 4	MEDIUM 3	SLIGHT 2	VERY SLIGHT 1
VERY HIGH 5	HIGH 25	HIGH 20	HIGH 15	MEDIUM 10	LOW 5
HIGH 4	HIGH 20	HIGH 16	MEDIUM 12	MEDIUM 8	LOW 4
MEDIUM 3	HIGH 15	MEDIUM 12	MEDIUM 9	LOW 6	LOW 3
LOW 2	MEDIUM 10	MEDIUM 8	LOW 6	LOW 4	LOW 2
VERY LOW 1	LOW 5	LOW 4	LOW 3	LOW 2	LOW 1

Table 5. Risk results.

Color	Risk Value	Assessment	Activity
Red	15, 16, 20, 25	Unacceptable Risk	Urgent action has to be taken with those risks
Blue	8, 9, 10, 12	Considerable Risk	Intervene those risks as urgently as possible
Green	1, 2, 3, 4, 5, 6	Acceptable Risk	Can be intervened in a longer term.

In addition to these results, also without considering the risks values with the severity of 4 and 5, they are taken under the definition of Unacceptable Risks.

4.3.3: Determination of Control Precautions

At this stage, in order to minimize the risks at an acceptable level, the control precautions are decided. The basic rule is to totally remove the threat. However; if this cannot be achieved, by using the method or methods below, being subject to the risk can be (acceptable level);

- Substitution by a less risky method, material, machine and equipment.
- Redesigning of the working method, process or machine and equipment.
- Isolation of the threat.

4.3.4: Completion of the Control Precautions

Completion of the control precautions comprise the following issues;

- Development of the working methods,
- Communication (sharing the precautions with the staff),
- Providing training and education,
- Supervision.

4.3.5: Monitoring and Repeating

At this stage the answers to these questions are sought;

- Are the selected control precautions completed as they are planned?
- Are the selected control precautions appropriate precautions?
- Are these control precautions applied?
- Are these control precautions applied properly?
- Is the exposure to the risks that are assessed removed or reduced sufficiently?
- Are the changes resulted in accordance with your objectives?

By recording all of the activities mentioned above, the calculation of the efficiency of the precautions is aimed.

Undoubtedly, it is possible to mention about hundreds of risk factors in interior locations. But, in this study, it is focused on the threats mostly met. By scoring these risks, preventive precaution is brought for each of them.

5.Discussion And Conclusion

There are many risk factors having potential impact on both the staff and the collections at Museum and Library-Archive (Information-document centers) buildings. However, in studies done until recently, the concept of protection has been separately analyzed for the staff in terms of occupational health and safety) or the collections in libraries (in conservative aspect). In this study, with a "holistic approach" it is stressed that all of the factors causing life and material loss shall be considered.

In these buildings, precautions against earthquake and fire shall be taken in the first instance. The precautions to be taken before the fire can be grouped as follows:

- Training the staff on risk factors causing fire, fire types, fire extinguishers and what to do in case of fire,
- Forming emergency action plan covering the fire situation for the business locations and making fire drill once in six months periodically,
- At sites where archive materials are stored, forming automatic fire sensing and extinguishing systems,
- Storing different materials (chemical materials, etc.) at the warehouses,
- Dying the walls by fire retardant and non-toxic dye,
- Not making storage close to especially electrical panels,
- Fluctuations happening in electricity network,
- Due to the fact reasons such as air and dust injected to electrical panels cause to short circuit, etc. cause to sparkling, and this results in blazing of the combustible material stored closely, removal of these fluctuations and leakage current,
- Closing the covers of cable connection boxes, electrical fuse and cable canals properly and making regular maintenance of the installment,
- In order to avoid the cables at passage routes, to be damaged by any mechanical impact, placing into the canals or cable boxes made by unbreakable material,
- Storage in front of fire boxes and portable fire extinguishers shall be avoided in a way not to enable easy access in emergency cases.

With the aim of providing dust control, developing technology shall be used, the location shall be monitored by measurement devices, by the help of filtered ventilation systems, controlling of the potential dust emission shall be made and accordingly, occupational disease of the staff or the microbiologic activity in the collections by the physical structure of the dusts shall be avoided.

Periodic examination of the staff shall be made and by selecting the appropriate staff for this work, by considering Sick Building Syndrome (SBS) examinations for lung symptoms and respiration functions shall be made.

In order to avoid the impacts of earthquake disaster and nonstructural material resulted by man-made threats on the collections and staff / users training, periodic control shall be continued.

Regarding library-originated diseases, with the help of Occupational Disease Posters and Training, formation of the awareness for all of the staff, readers and visitors shall be obtained. Personal protectors shall be absolutely used in case of restoration or cleaning of the collections. Within the scope of this study, determination of the threats/risks against the staff and archive materials at library buildings, making risk assessment, making rehabilitation studies to reduce/remove risks, revising the plans by frequent revisions (including emergency plans) and making this method a model for all of the libraries are analyzed.

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ANNEX 1: Risk Assessment

Abbreviations:

In Terms of Staff and Work Environment: Death (D), Injury (I), Intoxication (T), Shock (S), Other (O), Material Loss (ML), Contagious Disease (CD), Occupational Disease (OD), Fire (F)

Injury (I) : Fracture, dislocation, incision, organ rupture, paralyses, go into shock

Risk In Terms of Library and Archive Materials: Damage (Dm), Extinction (E)

DANGER CODE: Emergency / Disaster (E/D), Environmental Conditions (EC)

IMPACT: Staff and User (SU), Library and Archive Material (LAM)- Organic based

UNIT: Reading Hall (RH), Storage area (SA), Building wide

Table 6. Risk levels definition.

RANK	RISK VALUE	DECISION	ACTION
1	**1**	Unimportant risks	**NO EMERGENCY MEASURE REQUIRED**
2	2,3,4,5,6	Acceptable Risks	**REQUIRES TO BE COVERED IN ACTION PLAN**
3	8,9,10,12	Medium Level Risks	**SHALL BE CAREFULLY MONITORED AND REMOVED AS BEING COVERED BY ANNUAL ACTION PLAN**
4	15,16,20	Crucial Risks	**SHALL BE REMOVED AS BEING COVERED BY SHORT TERM ACTION PLAN**
5	25	Unacceptable Risks	**URGENT ACTION TO BE TAKEN BY BREAKING OFF**

Unit	Work	Danger Code	Threat	Impact	Risk	Evaluation in accordance with the result of the danger			Current Measures / Measures Required To Be Taken	Reevaluation as the result of risk reduction		
						D	S	DxS		D	S	DxS
RH, SA	Library/Archive service	E/D1a	Flapping of the shelves due to not being fixed in a potential disaster	SU	D, I, ML	3	5	15	Stabilizing being apt to the standards, training	**2**	5	10
RH, SA	Library/Archive service	E/D1b	Flapping of the shelves due to not being fixed in a potential disaster	LAM	Dm, E	3	4	12	Stabilizing shelves, putting nonskid material on the shelves, putting barriers in front of the shelves	2	4	8
RH, SA	Library/Archive service	E/D2a	Hard to make disposal in a potential disaster due to narrow distance between the shelves	SU	D, I, ML	3	4	12	Making the interval of the shelves apt for the disposal, stabilization	1	4	8
RH, SA	Library service	E/D2b	Hard to make disposal in a potential disaster due to narrow	LAM	Dm, E	3	3	9		1	3	3

			distance between the shelves									
RH, SA	Electric cable	E/D3 a	Fire potential due to arcing	SU	D, I, ML	3	4	15	Providing fire tubes, automatic fire extinguishing systems (temperature, smoke sensor, sprinkler system, etc.) at business locations and storage areas.	1	4	4
RH, SA	Electric cable	E/D3 b	Fire potential due to arcing	LAM	Dm, E	4	4	16		2	4	8
BW	Electric works	E/D4 a	Electric shock/fire potential due to not having residual current device	SU	D, I	4	4	16	Locating residential current device , using procedures to the panel in accordance with the legislation, training and periodical control	2	4	8
BW	Electric works	E/D4 b	Fire potential due to not having residual current device	LAM	ML	4	5	20		2	5	10
RH, SA	Electric works	E/D5 a	Irregular installment of the electric cables (risk of stumbling and falling)	SU	I	5	5	25	Electric cables shall be taken into cable canals, cable mess shall be avoided	1	5	5
RH, SA	Electric works	E/D5 b	Irregular installment of the electric cables (risk of dropping archive	LAM	ML	4	5	20	Much archive materials shall not be handled but transported by containers, training	1	5	5

			material by stumbling and falling)									
RH, SA	Electric works	E/D6 a	Overloading of the electric equipments	SU	I, D	4	5	20	Adequate number of electric installment and plug shall be established for the equipment. No equipment with the capacity over the plugs shall be installed. Cables shall be taken within the canals.	2	5	10
RH, SA	Electric works	E/D6 b	Overloading of the electric equipments	LAM	ML	5	5	25	Providing that the shelves are located far from the areas overloading is made, increasing precautions against the fire.	3	5	15
RH, SA	Fire measure	E/D7 a	Fire potential due to lack of fire sensing (smoke, heat detector, etc.)	SU	D, I, ML	3	5	15	Adequate number of fire extinguishing equipment shall be provided in accordance with the emergency plan and by locating them visible places, the staff shall be trained.	1	5	5
RH, SA	Fire measure	E/D7 b	Fire potential due to lack of fire sensing	LAM	Dm, E	5	5	25	Especially at storage areas and areas where books are	2	5	10

			(smoke, heat detector, etc.)						present, additional precautions shall be taken.			
BW	Fire measure	E/D8 a	The potential for growth of fire due to lack of fire tubes and boxes	SU	D, I, ML	5	5	25	Locating fire tubes and boxes in accordance with the provisions of the regulation regarding the fire protection of the buildings and training the staff shall be provided.	2	5	10
BW	Fire measure	E/D8 b	The potential for growth of fire due to lack of fire tubes and boxes	LAM	Dm, E	5	5	25	Fire tubes shall be increased at locations where storage areas and books are present, no barrier shall be located in front of the fire boxes to avoid the use.	2	5	10
BW	Library service	E/D9 a	Inadequate safety precautions	SU	D, I, ML	3	5	15	Business place camera systems shall be under record at 7/24. Alarm system shall be installed against theft. Camera systems shall be regularly detected. Night vision shall be clear.	1	4	4
BW	Library/Archive service	E/D9 b	Inadequate safety precautions	LAM	Dm, E	4	5	20	At locations where books are present, safety shall be performed by cameras.	2	4	8

RH, SA	Library/Archive service	E/D10a	Non-fixed heaters (risk of dropping and flapping)	SU	D, I	4	5	20	Fixed shelves, tvs, electric heaters or other devices shall be fixed to avoid dropping on the staff and users at libraries.	2	5	10
RH, SA	Library/Archive service	E/D10b	Fixing heaters (dropping, flapping risk)	LAM	ML	5	5	25	These type of devices shall be fixed far from the shelves in order to avoid dropping over the books.	2	5	10
RH, SA	Ventilation	EC1a	Inadequate air-conditioning	SU	OD,CD, ML	3	4	12	Closed business locations shall be ventilated totally not less than one hour once every day. Airflow shall be avoided for the staff not to be affected.	1	4	4
RH, SA	Ventilation	EC1b	Inadequate air-conditioning	LAM	Dm, E	3	4	12	Installment of air-conditioning systems, if not possible making natural ventilation in order to avoid deterioration of the books.	1	4	4
RH, SA	Lightening	EC2a	Inadequate lightening	SU	OD,CD, ML	3	4	12	Adequate lightening shall be provided at all of the locations and lightening shall be operable. Broken lambs	2	4	8

									shall be changed, electrician shall be called for other problems. The corridors and ladders shall be minimum 50 lux, toilet and lavabos 100 lux, cellar and material storage areas 200 lux, kitchen and offices 500 lux, no situation to avoid lightening shall be created.			
RH, SA	Lightening	EC2b	Inadequate lightening	LAM	Dm, E	4	4	16	With the aim of controlling daylight, tunable curtains/light filter shall be applied for the windows.	2	4	8
BW	External factor	EC3a	Traffic-originated air pollution	SU	OD,C D, ML	3	4	12	Controlling of the location by air pollution measurement devices and making examination of the staff, cleaning air by HVAC method.	1	4	4
BW	External factor	EC3b	Traffic-originated air pollution	LAM	Dm, E	4	4	16	Controlling of the location by air pollution measurement devices and protecting collections by moving to	2	4	8

									micro scale if required (closed shelves, boxes)			
RH, SA	Library service	EC4a	Library floor covered by carpet	SU	OD,CD, ML	4	5	20	Covering the floor by a hygienic material by removing the carpet	1	5	5
RH, SA	Library/ Archive service	EC4b	Library floor covered by carpet	LAM	Dm, E	4	4	16		2	4	8
RH, SA	Library/ Archive service	EC5a	Inadequate sitting groups in ergonomic aspect	SU	OD,CD, ML	3	4	12	Providing ergonomic sitting groups for the staff, making the positing of the computers apt to the standards, training.	1	4	4
RH, SA	Library/Archive service	EC5b	The shelves are not in the required standards	LAM	Dm, E	3	3	9	Making the archive material that is stored as jammed and over and over be apt to the standards	1	3	3
BW	Library/Archive service	EC6a	Not obeying hygienic rules at the business location	SU	OD,CD, ML	4	4	16	The cleanness of the materials and equipments shall be elaborated. The hygiene and control of the food shall be considered. Warning signs shall be used.	2	4	8
BW	Library/Archive service	EC6b	Not obeying hygienic rules at the business location	LAM	Dm, E	3	4	12		1	4	4
RH, SA	Library/Archive service	EC7a a	Library floor is slippy	SU	OD,CD, ML	4	5	20	The floor coverings shall be steady, dry and smooth and nonslip as much as possible; dangerous slopes, holes and	2	5	10

									barriers shall not be present.			
RH, SA	Library/Archive service	EC7b	Library floor is slippy	LAM	Dm, E	4	4	16	The books shall be transported in containers.	2	4	8
BW	Library/Archive service	EC8a	Default use of the chemicals at the business location	SU	OD,CD, ML	5	5	25	The chemicals used for cleaning shall be put closed in appropriate locations and conditions, necessary tagging and warning boards shall be applied, they shall be used with Personal Protective Equipments.	2	5	10
BW	Library/Archive service	EC8b	Default use of the chemicals at the business location	LAM	Dm, E	4	5	20	In order to avoid that books are Knot affected by these chemicals, chemicals shall be put away from the books	1	5	5
BW	Library/Archive service	EC9a	Not making insect control at the business location	SU	OD,CD, ML	3	4	12	Any measure shall be taken to avoid insects, bugs and rodents at the business locations and outhouses; substances such as insecticide, rodenticide shall be used, the conditions causing reproduction shall be	1	4	4

									terminated, wire cage shall be placed to doors and windows against flies.			
BW	Library/Archive service	EC9b	Not making insect control at the business location	LAM	Dm, E	4	5	20	Periodic disinfestations shall be made to avoid bugs and microorganisms enude to the books.	2	5	10
RH, SA	Library/Archive service	EC10a	Positing the air-conditioner not apt for the business location	SU	O	4	4	16	Adjusting the air-conditioners apt to the position of the staff (in order to avoid they are affected from the airflow) shall be provided.	2	4	8
RH, SA	Library/Archive service	EC10b	Positing the air-conditioner not apt for the business location	LAM	Dm, E	3	4	12	Damaging of the archive materials by the negative air situations of different regions shall be avoided.	1	4	4